IT is commonly believed that the aboriginal Aino race, inabiting the Island of Yezo in Northern Japan, is rapidly dwindling away before the advance of civilization. But, according to the information lately published in Japan, this popular belief does not appear to be altogether corroborated by facts. Under the old Japanese *régime*, the population of Yezo emigrants from the other Japanese islands was estimated at 40,000, but in consequence of protection and encouragement given by the reformed Government, this number increased to 350,000 in 1888. As a natural consequence, the Ainos' means of sustenance were encroached upon, and they have been popularly believed to be going down before the advance of the dominant race. But the latest statistics show that the truth is far from the common hypothesis, and that this curious and interesting race is not dying out, as has been supposed. The exact figures are as follows :—

Aino Population in Yezo.

Year.	Male.	Female.	Total.
1872	7964	7311	15,275
1873	8167	8032	16,199
1874	8171	8160	16,331
1875	8547	8583	17,130
1876	8579	8598	17,177
1877	8483	8483	16 966
1878	8537	8521	17,058
1879	8513	8515	17,028
1880	8566	8575	17,141
1881	8476	8457	16,933
1882	8546	8652	17,198
1883	8617	8615	17,232
1884	8702	8770	17,472
1885	8635	8687	17,322
1886	8464	8571	17,035
1887	8437	8525	16,962
1888	8475	8587	17,062

MESSRS. **CASSELL** have published the first part of what promises to be a book of considerable value. The work is entitled "Our Own Country," and will present, with illustrations, a geographical and historical description of the chief places of interest in Great Britain and Ireland. The same publishers have just issued the first part of a work on "Familiar Trees," by G. S. Boulger, with 80 coloured plates ; and Part 29 of their excellent "New Popular Educator."

A WORK entitled "Memorials of John Gunn" will shortly be issued. It will be edited by Mr. Horace B. Woodward, and will contain notes by the late Mr. Gunn, presenting some account of the Cromer forest bed and its fossil Mammalia, and of the associated strata in the cliffs of Norfolk and Suffolk. Mr. Gunn, while acting as a country clergyman, had for many years devoted a large share of his attention to the geology of Norfolk. The "Memorials" will be accompanied by a portrait and biographical sketch of the author.

THE following lectures will be given at the Royal Victoria Hall : March 10, Mr. J. E. Flower on "Spain" ; 17th, Mr. A. W. Clayden on "Thunderstorms" ; 24th, Prof. Roger Smith on "St. Paul's."

PROF. SEUBERT contributes an important paper to the current number of *Liebig's Annalen*, in which are presented the final results of his redetermination of the atomic weight of osmium. A preliminary account of the earlier portion of this work was published in the *Berichte* in June 1888, and a short notice concerning it was given in these columns (vol. xxxviii. p. 183). It was then shown that the atomic weight of osmium was certainly not higher than 191, and was probably a few decimals less. Owing, however, to lack of material, Prof. Seubert was not able to complete the work in the unimpeachable manner characteristic of his other atomic weight determinations. Since that time, however, thanks to the kindness of Prof. Lothar Meyer, a sufficient quantity of pure osmium has been placed at his disposal, and the work has been completed in a manner which leaves nothing to be desired. The salts analyzed were potassium and ammonium osmium chloride, K_2OsCl_6 and $(NH_4)_2OsCl_6$. The final mean value derived from all the experiments is 190·3, a number which fully justifies the expectations of Prof. Seubert that it would fall slightly below 191. The importance of the settlement of this question cannot be over-rated, for it removes the last outstanding exception to the periodic generalization. The metals of the platinum group—osmium, iridium, platinum, and gold—when arranged in the order of their chemical and physical properties unmistakably take the relative precedence just quoted. If these properties are, as everyone now agrees, periodic functions of atomic weight, the atomic weights of these metals should increase from that of osmium upwards to that of gold. Previous to the year 1878, however, the accepted atomic weights were : gold 196·2, iridium 196·7, platinum 196·7, and osmium 198·6—a relation which, if correct, was diametrically opposed to the principle of periodicity. In that year Seubert attacked the subject, and the first outcome of his labours was to correct the atomic weight of iridium, which he found to be 192·5, instead of 196·7. It was a most remarkable tribute to the accuracy of Seubert's work, and likewise of his own, that Joly a short time ago obtained for the same constant the identical number, 192·5. In 1881, Seubert took up the case of platinum, and finally adjusted its atomic weight to 194·3—a number which was confirmed by a subsequent determination of Halberstadt. In 1887 the position of gold was finally decided by the remarkably agreeing and almost simultaneous determinations of Thorpe and Laurie on the one hand, and Krüss on the other, the value arrived at in both cases being practically 196·7. Finally, we have the just completed work of Seubert upon osmium ; and the four metals, when arranged in order of atomic weight, now take the order : osmium 190·3, iridium, 192·5, platinum 194·3, gold 196·7—an order of precedence in full accord with the order of their chemical and physical properties.

THE additions to the Zoological Society's Gardens during the past week include a Red-throated Diver (*Colymbus septentrionalis*), British, presented by Mr. E. J. Gale ; a Herring Gull (*Larus argentatus*), British, presented by the Rev. C. A. Berry ; twelve Grayling (*Thymallus vulgaris*) from British fresh-waters, presented by Messrs. Howard L. Cooper and — Jukes ; a Wapiti Deer (*Cervus canadensis* ♂) from North America, a Long-tailed Weaver Bird (*Chera progne*) from South Africa, two Chinese White-Eyes (*Zosterops simplex*) from China, deposited ; four Upland Geese (*Bernicla magellanica* ♂ ♂ ♀ ♀) from the Falkland Islands, purchased ; a New Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*) from New Zealand, two Wonga-Wonga Pigeons (*Leucosarcia picata*) from New South Wales, received in exchange ; a Gayal (*Bibos frontalis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE PERMANENCE OF MARKINGS ON VENUS.—In *Bulletin No. 12 de l'Académie Royale des Sciences de Belgique*, Dr. Terby contributes a paper entitled, "Facts demonstrating the permanence of the dark spots on Venus, and the slowness of their motion of rotation." Dr. Terby made a series of observations of Venus between April and August 1887, and sent some of the results, in a sealed packet, to the Academy in the same year. A similar series of observations was made by M. Perrotin from May to September 1890, and the results were communicated to the Paris Academy (*Comptes rendus*, October 27, 1890). The object of the present paper is to call attention to the fact that the drawing made by M. Perrotin in 1890 agrees in every respect with those made by Dr. Terby in 1887. Each observer made drawings of two types of markings, and in each case the change from one type to the other took place about two months

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after the first observation. A comparison shows that Venus occupied very nearly the same position in her orbit during the time that the drawings were made by the two observers. The earth's position was also little different in both cases. This agreement between independent observers seems therefore to justify the following conclusions:—

(1) The observations were made on the same portion of the planet's surface.

(2) Venus, in travelling over the same part of her orbit, after an interval of three years, or after five complete revolutions, presented the same part of her surface to the same part of the heavens during the respective periods of observation.

(3) Therefore the planet at these two epochs also presented very nearly the same face to the sun.

(4) Venus has therefore a very slow rotational motion, as has been suggested by Signor Schiaparelli, and confirmed by M. Perrotin.

(5) There exist not only light spots on the planet's surface, but also dark ones having a fixed character similar to those on Mars; these spots are fixed enough to be recognized after an interval of three years, but are difficult to see, on account of their undefined edges, due, probably, to a dense atmosphere full of clouds. Up to now, the permanence of the dark spots was much questioned; these spots, however, do not appear to resemble those drawn by Bianchini and De Vico.

Observations made by various other observers are quoted in support of these conclusions, and in favour of the probability that the time of revolution is equal to that of rotation. A plate containing forty-three drawings of Venus accompanies the paper.

Observations of Mars.—The above-named *Bulletin* contains also some observations of Mars made by M. J. Guillaume last year, by means of a With's reflector about 9 inches in aperture, and a power of about 195. Twenty-five drawings of the planet are given, and with each the times of observation and the longitude of the central meridian calculated from the ephemerides furnished by Mr. Marth. This facilitates the comparison of the drawings with those made by other observers. In spite of the bad atmospheric conditions under which M. Guillaume, like many other astronomers, has had to labour, he has had the good fortune to see a certain number of canals, and gives a drawing of their gemination. The variations in the appearance of some of the seas observed on different occasions leads to the conviction that they can only be explained by the presence of clouds in the Martian atmosphere.

New Variable.—*Wolsingham Observatory Circular*, No. 29, reads:—A star, 8·5 mag., red, third-type spectrum, not in the D.M., was observed here on January 31 and February 1 and 2, in R.A. 5h. 32m. 37s., Decl. + 31° 57′ (1855). The star is perhaps variable.

New Asteroid.—M. Charlois, of Nice Observatory, discovered another asteroid on February 16. Its designation will be (306); its magnitude is 11·5.

THE MAMMALIAN NERVOUS SYSTEM.[1]

1. *Introduction.*

In the Proceedings of the Royal Society, No. 273, November 1888 (vol. xlv., 1889, p. 18), we published a preliminary account of some of the experiments of which the results are given in detail in our full paper.

In that communication we stated that the object of our work then was to endeavour to ascertain the character of the excitatory processes occurring in nerve-fibres when either directly, *i.e.* artificially excited, or when in that state of functional activity which is due to the passages of impulses along them from the central apparatus. The most important way in which such a method could be applied was, obviously, one which would involve the investigation of the excitatory changes occurring in the fibres of the spinal cord when the cortex cerebri is stimulated. We must at once assume that the motor side of the central nervous system is practically divisible into three elements:—(1) *Cortical centres.* (2) *Efferent* (pyramidal tract) *fibres*, leading down through the internal capsule, corona radiata, and spinal cord. (3) *Bulbo-spinal centres* contained in the medulla and the spinal cord, and forming the well-known nuclei of the cranial and also of the spinal motor nerves.

It had already been determined, both by direct observation and by the graphic method, (1) that certain areas of the cortex were connected with definite movements of various parts of the body, and (2) that while the complete discharge of the cortical apparatus was followed by a very definite and characteristic series of contractions of the muscles in special relation with the particular point excited, the effectual removal of the cortical central mechanism and subsequent excitation of the white fibres passing down through the internal capsule, &c., led to the production of only a portion of the effect previously obtained from the uninjured brain.

This method of observation in no wise showed what processes were actually occurring in the spinal and other nerve-fibres, and although the ablation of the cortical centre to a certain degree suggested the extent to which the cortex acted, nevertheless it did not afford an exact demonstration of the same. Moreover, the data which the graphic method furnished were precluded, through their being muscular records, from determining what share, if any, the lower bulbo-spinal central nerve-cells took, either in the production of the characteristic sequence of contractions, or in the modification, whether in quality or in force, of the descending nerve-impulses during their transit. It seemed to us that the only way to approach this subject would be to get, as it were, between the cortex and the bulbo-spinal system of centres. This would be accomplished if some means were devised of ascertaining the character of the excitatory processes occurring in the spinal fibres of the pyramidal tract when, upon excitation of the cortex, nervous impulses were discharged from cortical cells, and travelled down the cord.

The question as to the extent to which it is possible to obtain physical evidence of the actual presence in nerve-fibres of excitatory processes, and thus to arrive at trustworthy data for the comparison of their amounts, is one which, up to the present, has been answered only indirectly, and that in two ways: first, by the extension of Helmholtz's classical experiment of determining the rate of transmission; and secondly, by observing those variations in the electrical state of nerve-fibres which Du Bois-Reymond discovered to be an invariable concomitant of the excitatory state. As will subsequently be shown in the historical retrospect, it is well known, through the researches of Du Bois-Reymond and others, that the fibres of the spinal cord, just as nerve-fibres in the peripheral trunks, are characterized by showing, when unexcited, an electrical difference between their longitudinal surface and cross-sections; and, furthermore, that when excited, a well-marked diminution of this resisting electrical state is produced in the fibres of the cord, as in those of nerve-trunks. Now, since such excitatory variations in the electrical state are presumably parallel in time and amount with the presence in the nerve of the series of unknown processes, termed excitatory, which a series of stimuli evokes, it was reasonable to presume that, if the cortex were discharging a series of nerve-impulses at a certain rate down the pyramidal tract, there would be a series of parallel changes in the electrical condition of the fibres in the cord tract, and that, with a suitable apparatus for responding to such changes, these might be both ascertained and recorded. The accomplishment of a further purpose, viz. the localization of both paths and centres by ascertaining the excitatory electrical effects in relation with them, was one of the main objects we had in view. In carrying it out, we found it was unnecessary to employ the electrometer, and, in fact, that it was advantageous to use the galvanometer, the record of which would be more easily and more accurately noted, since its graduation admits of far higher magnification. Moreover, with this instrument it was possible, by employing a series of stimuli, of known number and duration, to obtain quantitative results of definite comparative value, as will be shown further on; and thus, to compare both the size of different central paths and the amount of nervous energy discharged along the same path from different sources.

The plan upon which the full paper is framed is, first, to give an historical retrospect of the work of authors who have opened up the study of electrical changes in the central and peripheral nervous system; second, to describe at length our mode of experimentation, with special reference to the modifications which we have introduced; then to compare roughly

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[1] "On the Mammalian Nervous System; its Functions and their Localization determined by an Electrical Method." By Francis Gotch, Hon. M.A., Oxford, and Victor Horsley, F.R.S. (From the Physiological Laboratory of the University of Oxford.) Croonian Lecture read before the Royal Society on February 26.

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